

4.4.16-1 INTRODUCTION

The potential impact of the Project on energy consumption and greenhouse gas (GHG) emissions is evaluated in this chapter. The assessment considers impacts in the near future, impacts in the 20- to 35-year horizon, and impacts near the end of the century. The analysis assumes that in the No Action condition, trains would continue to run over the Portageville Bridge, but at lower speeds and lower weights than allowed by the Project. In addition, a discussion of the potential increases in energy that would result if the bridge cannot remain in use is provided in Chapter 4.6, "Indirect (Secondary) Effects."

4.4.16-2 METHODOLOGY

The assessment was prepared in accordance with the *Draft Energy Analysis Guidelines for Project-Level Analysis*, New York State Department of Transportation (NYSDOT), November 25, 2003 (NYSDOT guidance).

4.4.16-2-1 Background

There is general consensus in the scientific community that global climate change is occurring, and will continue to occur as a result of increased concentrations of GHGs in the atmosphere. This increase is associated with emissions of GHGs primarily from combustion of fossil fuels, as well as various other processes. Atmospheric concentrations of GHGs are increasing because these gases have very little chemical removal processes, and the rate of emission exceeds the rate of the various natural processes that remove these gases from the atmosphere. The increase in GHG concentrations, since the beginning of the industrial age, has led to a noticeable warming of the Earth's atmosphere, surface, and oceans, which, in turn, has and will result in myriad climatic changes that will vary by geographic location, including changes in precipitation levels and patterns, changes in oceanic circulation patterns, and the more frequent occurrence of extreme weather events.

Warming of the oceans leads directly to sea level rise due to thermal expansion—a process that is accelerated by the melting of glaciers, ice caps, and sea ice. Sea level rise is predicted to profoundly affect coastal land use and natural environments.

Changes in local climate patterns affect many natural systems and human environments, including drinking water availability and quality, species distribution and extinction, and disease patterns and propagation.

While the contribution of any single project to climate change is infinitesimal, the combined GHG emissions from all human activity potentially have a substantial adverse impact on the global climate. To address this growing concern, environmental review under NYSDOT guidance seeks to address the changes in GHG emissions associated with a project, rather than the specific contributions of a project to climate impacts.

4.4.16-2-2 Policies, Regulations, Standards, and Benchmarks

As a result of the growing consensus that human activity resulting in GHG emissions has the potential to profoundly impact the earth's climate, countries around the world have undertaken efforts to reduce emissions by implementing both global and local measures addressing energy consumption and production, land use, and other sectors. Although the U.S. has not ratified the international agreements that set emissions targets for GHGs, the U.S. has committed to reducing GHG emissions to 17 percent lower than 2005 levels by 2020 and to 83 percent lower than 2005 levels by 2050 via the Copenhagen Accord.¹ Although legislation targeting this commitment is still pending, without such legislation the U.S. Environmental Protection Agency has indicated its intent to move forward with regulation of greenhouse gases under the Clean Air Act, and has begun preparing and implementing regulations. The federal government has also begun implementing various other regulatory and funding programs aimed at achieving energy efficiency and GHG reductions.

There are also regional, state, and local efforts to reduce GHG emissions. In 2009, New York Governor Paterson issued Executive Order No. 24, establishing a goal of reducing GHG emissions in New York by 80 percent, compared to 1990 levels, by 2050, and creating a Climate Action Council tasked with preparing a climate action plan outlining the policies required to attain the GHG reduction goal. That effort is currently under way, and an interim draft plan has been published.² The 2009 New York State Energy Plan outlines the state's energy goals and provides strategies and recommendations for meeting those goals, and explicitly identifies the need for increasing rail freight options.³ The state's goals include:

- Implementing programs to reduce electricity use by 15 percent below 2015 forecasts;
- Updating the energy code and enacting product efficiency standards;
- Reducing vehicle miles traveled by expanding alternative transportation options; and
- Implementing programs to increase the proportion of electricity generated from renewable resources to 30 percent of electricity demand by 2015.

The State Energy Plan is currently being updated, and the draft 2014 Plan is currently undergoing review.⁴ The Draft Plan seeks to take these policies further, reducing carbon intensity of the energy sector by 50 percent by 2030, and listing many energy efficiency and clean energy initiatives, aiming for more clean, efficient distributed generation and transportation, and more.

These policies were evaluated through the Climate Action Plan process, including the goal of maintaining, improving, and expanding freight rail operations. Overall, projects such as the Portageville Bridge Project are consistent with federal, regional, and state goals of reducing energy consumption and GHG emissions.

The New York State Rail Plan (NYSDOT, 2009) identifies the Portageville Bridge as one of 10 bottlenecks in New York State's Class I rail network. The plan finds that the Portageville Bridge limits the load carrying capacity and operating speed of the Southern Tier route. The report concludes that, "the weight restrictions and low operating speeds significantly impact the line's overall capacity. Any long-term closing of the Portageville Bridge would threaten the vitality of the entire route between Buffalo and Binghamton."

¹ Todd Stern, U.S. Special Envoy for Climate Change, letter to Mr. Yvo de Boer, UNFCCC, January 28, 2010.

² <http://www.dec.ny.gov/energy/80930.html>.

³ New York State, *2009 New York State Energy Plan*, December 2009.

⁴ <http://energyplan.ny.gov/>

Currently, there are no specific benchmarks or regulations applicable to GHG emission levels or impacts from actions subject to environmental review in New York State. Accordingly, the potential effects of the Project have been evaluated in the context of their consistency with relevant federal and state policies.

4.4.16-2-3 Assessment Methodology

The assessment was prepared in accordance with the NYSDOT guidance, which is intended to address requirements of both SEQRA and the National Environmental Policy Act (NEPA), where relevant. The criteria for determining whether a project requires energy and GHG analyses are as follows:

- **Regional Significance:** Energy analyses should be performed for all projects listed in Transportation Improvement Plans (TIPs) and Long Range Plans (Plans) that have been identified as regionally significant based on the criteria outlined in NYSDOT's Energy Analysis Guidelines for TIPs and Plans.

In addition, for projects that are not identified as regionally significant, but could have potential impacts on energy, the following quantitative thresholds may be used to determine the need for analysis:

- **Change in Vehicle Miles Traveled (VMT):**
 - An action along a corridor which could result in a VMT increase of greater than 10 percent;
 - An action in an urban area (as defined by the Metropolitan Planning Organization boundaries) which could result in a VMT increase of greater than 1 percent; or
 - An action in a rural area (within an NYSDOT region not defined as an urban area) which could result in a VMT increase of greater than 1 percent.
- **Transportation Facility Construction Costs:** Project costs on transportation facilities resulting in construction costs of \$50 million or more (transportation facilities include roadways, rail facilities airports, etc.).

According to these criteria, an energy and greenhouse gas analysis is not required for the Portageville Bridge Project. The Project is currently listed in the TIP and is not identified as regionally significant as it is not projected to increase VMT. In fact, the Project would not increase operational emissions at all since rail traffic is not projected to change as a result of the Project. Should this Project, if combined with future actions, result ultimately in increased rail freight traffic, it would do so as replacement for on-road truck operations, resulting in a net decrease in regional emissions, and would be considered an energy-efficient project. Therefore, a quantified analysis is not required. While the construction cost of the Project is expected to exceed \$50 million (estimated at \$67.5 million), given that the project is a replacement bridge that would have only a beneficial impact on emissions during operation, there is no benefit to quantifying construction emissions. Therefore, the following discussion is a qualitative, rather than quantitative, analysis of energy consumption or GHG emissions.

4.4.16-3 EXISTING CONDITIONS

In the existing condition, approximately 12 to 14 freight trains traverse the bridge per day. The locomotives operate on diesel fuel. The associated energy and fuel consumption, and the ensuing GHG emissions from the operation of the freight trains, is considerably less than that which would result from moving the same freight via trucks on-road. According to a recent study

of rail and truck fuel efficiency, freight movement by rail is generally more efficient than by truck, with fuel efficiency ratio for these two modes ranging from 1.9 to 5.5 on a ton-mile basis.⁵ When accounting for factors such as route circuitry and range, fuel savings can be considerable, ranging up to 1,100 gallons per carload.

However, the Portageville Bridge is more than 100 years old and cannot support modern standards for freight operations along the Southern Tier route. The bridge is structurally deficient, and as such, Norfolk Southern must operate trains at slower speeds (10 MPH) and at lower weight than the industry standard or elsewhere on the Southern Tier route. The bridge constrains the freight traffic that can be accommodated on that portion of the route it serves, and, therefore, has a negative impact on operations along the entire route. As discussed below, additional energy efficiency would be achieved if these speed and weight restrictions for the Southern Tier route's Genesee River crossing were lifted.

4.4.16-4 EFFECTS ASSESSMENT

4.4.16-4-1 No Action Alternative

Under the No Action Alternative, the bridge would be maintained as-is and, in the short term, there would be no change from the existing conditions. Ultimately, if the bridge falls into disrepair (temporarily or permanently), or if it can no longer support current operations, all operations would need to be stopped and freight would be rerouted or diverted to truck delivery. In both cases, this would result in higher energy consumption and an increase in GHG emissions. This is discussed in Chapter 4.6, "Indirect (Secondary) Effects."

Under this alternative, there would be no energy consumption or emissions associated with construction.

4.4.16-4-2 Preferred Alternative

The construction of a new bridge under the Preferred Alternative would ensure the long-term operation of rail freight on this route. As described, above, considerable energy savings and reduced GHG emissions are achieved by moving freight via rail rather than trucks. For the segment crossing the bridge, where trains operate at low speeds, and for the entire line where weight restrictions apply, additional energy efficiency would be achieved by the construction of the new bridge that would enable operation at closer to industry standard speeds and carrying standard weight loads. At speeds lower than 40 MPH, the energy necessary to move a train is spent mostly to overcome rolling resistance. The Federal Railroad Administration (FRA) has stated that optimally, trains should operate at approximately 50 MPH to be energy efficient and to avoid congestion.⁶ To effectively and efficiently serve its customers, Norfolk Southern aims to operate 286,000-pound train loads at speeds of 60 MPH on the Southern Tier route, resulting in energy savings and lower GHG emissions (see discussion of speeds and efficiency in section 4.4.16-3). Although future operating speeds over the bridge would be lower (35 MPH) due to curves on both of its approaches, this restriction only applies to that discrete section, and efficiencies would be gained as compared to current conditions.

Ultimately, this and associated potential future actions could result in the operation of double-stack trains on the Southern Tier route. This would also result in energy savings and a reduction in GHG emissions.

⁵ FRA, Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors, November 19, 2009.

⁶ FRA, Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors, November 19, 2009.

Similar to roadway reconstruction or maintenance, there would be some energy consumption and GHG emissions associated with the construction of the new bridge and removal of the existing bridge under the Preferred Alternative, due to on-site fuel use for construction engines and the production and delivery of construction materials. However, in the long term, these emissions would be offset by the energy savings associated with the efficiency of rail versus truck freight movement and by the associated long-term reduction in GHG emissions.

4.4.16-5 SUMMARY OF MITIGATION

Since the operation of the Project is not expected to increase energy consumption or GHG emissions, no mitigation of impacts is required.